

Module13: Stormwater Quantity Requirements and Minimum Standard 19

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Objectives

- Discuss the Virginia stormwater regulatory requirements for water quantity control and summarize the conceptual differences between the new criteria and the current (Part IIC) Minimum Standard 19 criteria.
- State the Minimum Standard 19 requirements that apply to projects after July 1, 2014.

13a. The Evolution of MS 19 Channel Protection Criteria

Erosion and Sediment Control Regulations:

Minimum Standard (MS) 19 of the Virginia Erosion and Sediment Control (ESC) regulations (9VAC25-840-40.19) requires designers to evaluate the adequacy of the downstream manmade and/or natural channels to safely convey the developed condition runoff. The criterion of the ESC regulations requires the designer verify the adequacy of all channels and pipes in the following manner:

1. Demonstrate that the total drainage area to the point of analysis within the channel is one hundred times greater than the contributing drainage area of the project (in which case the channel or pipe system is assumed to be adequate based on the correspondingly small impact of the project's runoff to the larger stream or channel system);
2. (a) Natural channels shall be analyzed by the use of a 2-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks.

(b) All man-made channels shall be analyzed by the use of a 10-year storm to verify that stormwater will not overtop its banks and by the use of a 2-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and

(c) Pipes and storm sewer systems shall be analyzed by the use of a ten-year storm to verify that stormwater will be contained within the pipe or system.

If the existing natural or manmade channels or pipes are not adequate, the applicant shall:

- (1) Improve the channel to a condition that meets 2(b) above;
- (2) Improve the pipe or pipe system so that the 10-year storm is contained within the system;
- (3) Develop a site design that:
 - will not cause the pre-development peak runoff rate from a two-year storm to increase when runoff outfalls into a natural channel; or
 - will not cause the pre-development peak runoff rate from a ten-year storm to increase when runoff outfalls into a man-made channel; or
- (4) Provide a combination of channel improvement, stormwater detention or other measures which is satisfactory to the VESCP authority to prevent downstream erosion.

The concept of implementing a "site design" (item (3) above) that will not cause the pre-development peak runoff rate from a two-year storm to increase is a foreshadowing of the goal of the Virginia Runoff Reduction Method (VRRM); however the common interpretation has been (and still is) to implement a detention basin design that limits the peak rate of runoff from the 2-year storm to that of the pre-developed condition.

The regulations go on to apply numerous provisions to further define the implementation of the respective solution. These provisions do not necessarily address the complexity of the analysis required to adequately describe a natural channel and the relative “equilibrium” achieved in response to the existing watershed hydrology, and the potential change (increased erosion or other response) to increases in runoff volume, duration, or peak rate of flow.

Virginia Stormwater Management Regulations (Part IIC):

Guidance on the analysis of channel or drainage system adequacy and compliance with the accompanying criteria is provided in the VESCH, the 1999 VSMH and/or local program guidance. The specific criteria related to the interpretation of the “site design” or detention option of item (3) has changed for some local jurisdictions based on the updates to the Virginia SWM regulations in 1999 with language now captured in **9VAC25-870-97 of Part IIC** (Stream Channel Erosion):

The locality's VSMP authority may determine that some watersheds or receiving stream systems require enhanced criteria in order to address the increased frequency of bankfull flow conditions (top of bank) brought on by land-disturbing activities or where more stringent requirements are necessary. Therefore, in lieu of the reduction of the two-year post-developed peak rate of runoff, the land development project being considered shall provide 24-hour extended detention of the runoff generated by the one-year, 24-hour duration storm.

Virginia Erosion and Sediment Control and Stormwater Management Law:

An additional provision was added to the ESC and SWM Laws to establish a “safe harbor” provision for those projects discharging to an eroded channel that by definition could not be made adequate without implementing offsite stream restoration and/or stabilization.

The requirement to implement downstream channel improvements or restoration is often impracticable in urban areas where impacts to stream channels have been ongoing for decades and the burden of repair or stabilization cannot be equitably assigned to any single new development. Nor can any degree of site design or onsite detention strategies on the new development project effectively improve or reduce the existing rate of erosion and impact. As such, this lack of an adequate channel could be interpreted as disallowing any further development in the watershed until significant stream restoration is accomplished.

While a watershed scale restoration project may be under consideration in a jurisdiction, the “safe harbor” provision was intended to allow the new development to proceed with on-site requirements that would minimize additional impacts to the channel to the maximum extent practicable (within the construct of onsite detention). Thus, yet another option for compliance with Part IIC (or Part IIB) is provided (§ 62.1-44.15:28 A.10):

Any land disturbing activity that provides a stormwater management design in accordance with the following shall satisfy the Virginia stormwater quantity requirements and shall be exempt from any flow rate capacity and velocity requirements for natural or man-made channels:

- (i) 48 hour Extended Detention of the water quality volume (**WQv**);
- (ii) 24 hour Extended Detention of the runoff resulting from the one year, 24-hour storm; and
- (iii) Proportional reduction of the allowable peak discharge resulting from the 1.5-, 2-, and 10-year, 24-hour storms using forested condition **Energy Balance**.

Therefore, projects complying with Part IIC have multiple options as may be allowed (or required) by local ordinances and include various definitions that may be different than those in the new regulations, including **Adequate Channel**, WQv, etc.

New Virginia Stormwater Management Regulations (Part IIB):

The Channel Protection criterion of Part IIB of the new SWM regulations (9VAC25-870-66 Water Quantity) requires that:

- Concentrated stormwater flow must be released into a **Manmade, Restored, or Natural Stormwater Conveyance System** and must meet the criteria established for each to the limits of analysis as described in the regulations.

There are similarities to the old criteria especially for the discharge to the Manmade Channel (Part IIC) or the Manmade Receiving Channel (Part IIB) where both criteria include ensuring non-erosive flow velocity for the peak runoff from the 2-year storm event.

There are also differences, the most significant being that the designer is no longer responsible for documenting the adequacy of natural channels (or more accurately stated: Natural Stormwater Conveyance System). Rather, the criterion simply requires the application of the Energy Balance

Method as a design standard that must be implemented when discharging to a natural channel; regardless of its condition (unless a local watershed plan has identified an alternative criterion).

Another difference is the separation of the Channel Protection and the Flooding criteria into separate items under the same subsection: **9VAC25-870-66.B. Channel Protection** and **9VAC25-870-66.C. Flood Protection**. Module 14 addresses these two regulatory items further.

13b. MS-19 Post 2014

Components of Minimum Standard 19 still apply for plans submitted for approval after July 1, 2014 (other than those that are grandfathered or extended under Part IIC):

9VAC25-840-40.19.d.	The applicant must provide evidence of permission to make improvements
9VAC25-840-40.19.e.	All hydrologic analyses must be based on existing watershed characteristics and ultimate development condition.
9VAC25-840-40.19.f.	Maintenance plan for stormwater detention options required: <ul style="list-style-type: none">• Must be approved by VESCP authority• Include maintenance requirements of facility and person responsible
9VAC25-840-40.19.g. <i>(portion supplanted by 9VAC25-870-66)</i>	<i>Outfall from a detention facility shall be discharged to a receiving channel, and <u>energy dissipaters shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.</u></i>
9VAC25-840-40.19.h.	All on-site channels must be verified to be adequate.
9VAC25-840-40.19.j.	Developments consisting of individual lots or parcels must be considered as a whole: <ul style="list-style-type: none">• Residential, commercial, or industrial• Hydrologic parameters in engineering calculations must reflect ultimate development condition
9VAC25-840-40.19.k.	Measures used to protect properties and waterways must be employed to minimize impacts on physical, chemical, and biological integrity of rivers, streams and other waters of the state.
9VAC25-840-40.19.m.	Plans approved on and after 7/1/2014 must comply with flow rate capacity and velocity requirements of the VSM Act and the VSMP regulations (9VAC25-870-66).
9VAC25-840-40.19.n.	Compliance with water quantity minimum standards in 9VAC25-870-66 of VSMP regulation satisfies requirements of MS-19.

Channel Adequacy

Minimum Standard 19 still defines channel adequacy for manmade channels and onsite channels as follows:

Manmade Channel Must convey the 10-year storm without overtopping and the 2-year storm without eroding.

Pipes — Must convey the 10-year storm.

It is important for the reviewer to be familiar with the capacity (runoff/Q) and erodibility (velocity/V) requirements in order to verify the adequacy of stormwater conveyance channels and pipe systems associated with a development project. For more information on how conveyance channels are analyzed to determine if they meet these requirements, refer to Module 12.

Notes
